#3

Attorney Docket No.: 58260.011300

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: LIU, Yingjian

SERIAL NO.: 10/506,467

FILED: September 1, 2004

FOR: WIRELESS AND PASSIVE TABLET FOR INPUTTING TO COMPUTER

RESPONSE TO NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE

In response to the USPTO Notification of Missing Requirements mailed on June 27, 2005, we enclose a copy of the English translation of the application. We also enclose an executed Declaration and Power of Attorney form as required.

Early and favorable action by the Examiner is earnestly solicited.

AUTHORIZATION

If the Examiner believes that issues may be resolved by telephone interview, the Examiner is respectfully urged to telephone the undersigned at (212) 801-2146. The undersigned may also be contacted by e-mail at ecr@gtlaw.com.

No additional fee is believed to be necessary, other than the $130 for the English translation surcharge and the $65 for the late filing of the Declaration. The Commissioner is hereby authorized to charge any additional fees which may be required for this response, or credit any overpayment to Deposit Account No. 50-1561.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is

requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. 50-1561.

Dated: August 11, 2005

By: Respectfully submitted,

Eugene C. Rzucidlo
Registration No. 31,900
Customer Number: 32361

#3

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): LIU, Yingjian	Docket Number 58260.011300

Serial No.	Filing Date	Examiner	Group Art Unit
10/506,467	September 1, 2004		

Invention: WIRELESS AND PASSIVE TABLET FOR INPUTTING TO COMPUTER

I hereby certify that the following correspondence:

1. Transmittal (General) and Fee Transmittal
2. Copy of Notice of Missing Requirements Under 35 USC 371 In the United States Designated Office
3. Signed Declaration/Power of Attorney
4. Assignment
5. Assignment Recordation Sheet
6. English language translation of Application
7. Information Disclosure Statement and one (1) cited reference
8. Postcard receipt

(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

August 11, 2005
(Date)

Amy McFall
(Typed or Printed Name of Person Mailing Correspondence)

(Signature of Person Mailing Correspondence)

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Note: Each paper must have its own certificate of mailing.

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Rec'd PCT/PTO 11 AUG 2005

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U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
10/506,467	Yingjuan Liu	58260-011300

INTERNATIONAL APPLICATION NO.	
PCT/CN03/00284	
I.A. FILING DATE	PRIORITY DATE
04/18/2003	04/22/2002

32361
GREENBERG TRAURIG, LLP
MET LIFE BUILDING
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NEW YORK, NY 10166

58260
CASE 011300 ATTY ECR
DUE Aug. 27, 2005
1 MO. CALL-UP 7/27/05
BY Efm

CONFIRMATION NO. 8948
371 FORMALITIES LETTER

OC000000016319233

Date Mailed: 06/27/2005

NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as a Designated / Elected Office (37 CFR 1.495).

- Indication of Small Entity Status
- Copy of the International Application filed on 09/01/2004
- Copy of the International Search Report filed on 09/01/2004
- Oath or Declaration filed on 09/01/2004
- Request for Immediate Examination filed on 09/01/2004
- U.S. Basic National Fees filed on 09/01/2004

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Translation of the application into English. Note a processing fee will be required if submitted later than 30 months from the priority date.
- Translation of the application into English. The current translation of the application into English is defective as described below. Note a processing fee will be required if submitted later than 30 months from the priority date.
  - The number of claims in the International Application and the number of claims in the translation are not the same.
- Processing fee for providing the translation of the application and/or the Annexes later than 30 months from the priority date (37 CFR 1.492(f)).
- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date. The current oath or declaration does not comply with 37 CFR 1.497(a) and (b) in that it:
  - is not executed in accordance with either 37 CFR 1.66 or 37 CFR 1.68.

- **$65** Surcharge for providing the oath or declaration later than 30 months from the priority date (37 CFR 1.492(e)) is required.

SUMMARY OF FEES DUE:

Total additional fees required for this application is **$195** for a Small Entity:

- **$65** Late oath or declaration Surcharge.
- **$130** for English translation surcharge required.

ALL OF THE ITEMS SET FORTH ABOVE MUST BE SUBMITTED WITHIN TWO (2) MONTHS FROM THE DATE OF THIS NOTICE OR BY 32 MONTHS FROM THE PRIORITY DATE FOR THE APPLICATION, WHICHEVER IS LATER. FAILURE TO PROPERLY RESPOND WILL RESULT IN ABANDONMENT.

The time period set above may be extended by filing a petition and fee for extension of time under the provisions of 37 CFR 1.136(a).

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

*A copy of this notice **MUST** be returned with the response.*

TAMALA D HOLLAND

Telephone: (703) 308-9140 EXT 209

PART 1 - ATTORNEY/APPLICANT COPY

U.S. APPLICATION NUMBER NO.	INTERNATIONAL APPLICATION NO.	ATTY. DOCKET NO.
10/506,467	PCT/CN03/00284	58260-011300

FORM PCT/DO/EO/905 (371 Formalities Notice)

#3

Rec'd PCT/PTO 11 AUG 2005

10/506467

PTO/SB/17 (12-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	195

Complete if Known	
Application Number	10/506,467
Filing Date	September 1, 2004
First Named Inventor	Yingjian LIU et al.
Examiner Name	
Art Unit	
Attorney Docket No.	58260.011300

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 50-1561 Deposit Account Name: Greenberg Traurig LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☑ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	$0
Design	200	100	100	50	130	65	$0
Plant	200	100	300	150	160	80	$0
Reissue	300	150	500	250	600	300	$0
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	0	x $0	= $0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	0	x $0	= $0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims: Fee ($) $0 — Fee Paid ($) $0

08/17/2005 GFREY1 00000072 501561 10506467
01 FC:2617 65.00 DA
02 FC:1618 130.00 DA

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
0 - 100 =	0 / 50 =	0.0 (round up to a whole number) x	$250 =	$0

08/17/2005 VIRBY2 00000002 501561 10506467
01 FC:2616 145.00 DA

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	$130
Other (e.g., late filing surcharge): late oath fee	$65

SUBMITTED BY

Signature	[signature]	Registration No. (Attorney/Agent) 31,900	Telephone 212 801 2146
Name (Print/Type)	Eugene C. Rzucidlo		Date August 11, 2005

WIRELESS AND PASSIVE TABLET FOR INPUTTING TO COMPUTER

Field of the Invention

This invention relates to a peripheral equipment of a computer, more specifically, to a wireless and passive tablet for inputting to a computer.

Description of the Prior Art

By far, there are several tablet hardware manufacturers such as the WACOM in Japan, the AIPTEK in Taiwan and the HanWang Technology Co.,Ltd. in China. After several years of development, the tablet technique has been on the way to be matured. And more tablet products have come into the world and are on hot sale, such as wired tablet, wireless tablet, wired pressure-sensitive tablet, wireless pressure-sensitive tablet and the like. By principle, all these tablets may be divided into such kinds as the electromagnetic one, the touchable one, the ultrasonic-localizing one, the photoelectric one and so on. Till now, the WACOM Company in Japan is the major in manufacturing wireless and passive tablets in the industrial circles. The patents of WACOM's tablet have following two features: one is that the transmitting coil and the receiving coil are just the same one; the other is that it first emits an electromagnetic wave with the same frequency as a resonance frequency of a pen circuit for a period of time so as to resonate the inductor and capacitors in the pen circuit, then it stops emitting and switches to a receiving state, and thereafter the oscillation of resonant wave in the pen circuit will be attenuated, for there is no outer impetus to the inductors and capacitors in the pen circuit. The procedure above described is illustrated in Figure 3. Now a signal is extracted out through an amplifying and filtering circuit to finally determine the coordinate values of X and Y.

Summary of the Invention

The present invention is such a wireless and passive pressure-sensitive tablet. Wherein the term "wireless" means that nothing wires a pen and a tablet. And the term "passive" means that no battery is in the pen. And the term "pressure-sensitive" means that the tablet could sense the pen's pressure. The principal points of technique adopted in the present invention to determine the coordinate values of X and Y and to sense the pen's pressure are illustrated in Figure 1: wherein auxiliary CPU (MCU2) generates a square wave and inputs it to a transmitting circuit, the transmitted electromagnetic wave is inputted to a pen circuit to form resonance, then output to a receiving circuit and amplified by an amplifying circuit, which is connected with an output of the receiving circuit, then the resultant signal is input to both a phase angle detecting circuit and an amplitude detecting circuit to conduct phase angle detection and amplitude detection. After integral and A/D conversion, a signal is input to primary CPU. Thus, the function of inputting to the computer with a wireless passive pen has been realized. The operating process is as follows: a square wave, generated by the auxiliary CPU (MCU2), is inputted to a transmitting circuit. An electromagnetic wave, whose waveform is shown in Figure 2, is transmitted continuously through the coils of Y direction. By Fourier Transform, it is known that the square wave has higher harmonics with the frequencies of odd times of its own. And the resonance frequency determined by the resistors and capacitors of the pen is just a certain odd times of the square wave's frequency. Therefore, once the pen's resonant coil is induced by the higher harmonics of the square wave of the tablet's coil, it will resonate; and once a resonance signal is received by the receiving coil, it will be amplified by the amplifying circuit and then input to a multiplying circuit, where the signal's amplitude and phase angle are extracted. The embodiments of amplitude and phase angle extraction are as follows: multiplying the received signals with a square wave having the same frequency and phase to obtain an amplitude's square value; similarly, multiplying the received signals with an orthogonal square wave having the same frequency and a phase difference of 90 degree to obtain a

phase angle's square value. Finally, inputting the amplitude and the phase angle into the CPU after A/D conversion with the amplitude corresponding to the coordinate values of X and Y, and the phase angle being direct proportion to the pen's pressure. When the pen tip is pressed down, the pen's resonance phase deviates because of variation of the inductance in the pen. Therefore, current pressure from the pen can be obtained by measuring the very phase angle.

Differing from the tablet of WACOM Company, the present invention accomplishes its signal transmitting and receiving through the coils of direction X and Y respectively. Besides this, transmitting and receiving procedures of the present invention are conducted continuously, but not in an alternative way as the tablet of WACOM Company do.

A main function of the present invention is to convert tracks of handwriting to digital values, that is, X and Y coordinates and then input them into a computer. With the help of corresponding driver programs and applications, it can display tracks that a user draws on the tablet directly on the screen of computer. The tablet is primarily applied in the fields of handwriting identification system and drawing.

Brief Description of the Drawings

Figure 1 is a system block diagram of a wireless and passive tablet for inputting to computer;

Figure 2 shows waveforms transmitted electromagnetic wave according to the present invention;

Figure 3 shows waveforms of the resonance's decaying oscillation of the WACOM tablet;

Figure 4 is a pen's paralleled resonant circuit of the present invention;

Figure 5 is a transmitting and receiving circuit according to the present invention;

Figure 6 is an amplifying circuit according to the present invention;

Figure 7 is a phase angle and amplitude detecting circuit according to the present invention;

Figure 8 is an integrating circuit according to the present invention.

Detailed Description of the Preferred Embodiments

Hereinafter, the invention will be described in conjunction with the preferred embodiments and drawings.

The present invention comprises a pen and a tablet. Between the above two components, there is no connecting wire, and there is no battery in the pen either. The tablet can sense the pressure from the pen. The hardware of the tablet comprises a transmitting and receiving circuit, an amplifying circuit, a phase angle and amplitude detecting circuit and an integrating circuit. And the connection relations between them are as follow: a TX+ terminal of the phase angle and amplitude detecting circuit connects with a transmitting terminal of the transmitting and receiving circuit, a receiving terminal of the transmitting and receiving circuit connects with a RX+ terminal of the amplifying circuit, an output terminal (OUT) of the amplifying circuit connects with an input terminal (IN) of the phase angle and amplitude detecting circuit, an output terminal (OUT) of the phase angle and amplitude detecting circuit connects with an input terminal (IN) of the integrating circuit, and an A/D terminal of the integrating circuit is coupled into a primary CPU after A/D conversion.

The pen circuit primarily comprises a paralleled resonant circuit composed of capacitors and inductors. And the connection relations are illustrated in Figure 4, wherein an inductor L1 connects with a variable capacitor C1 and the capacitors C2, C3, C4, C5, C6 and C7 in parallel. Then the last two ends of the circuit connect with a switch K1 and a resistor R1 in series respectively, to form a loop. Herein, K1 is a switch on the side of the pen, functioning as the right button of a mouse.

A waveform of a transmitted electromagnetic wave according to the present invention is shown in Figure 2, wherein its cycle is of odd times of a resonance cycle determined by the resistors and capacitors in the pen.

The transmitting and receiving circuit of the present invention is illustrated in Figure 5, wherein the part in the direction of Y is a continuous transmitting circuit. By sequentially gating the transmitting circuits Y1, Y2……Y18……Y24, and regularly gating the receiving circuits Xl, X2……X18……X24 in turn, the position in Y coils can be determined for the pen according to the strength of a received signal, that is, which Y coils the pen locates can be determined. Similarly, by regularly gating the transmitting circuits Y1, Y2……Y18……Y24 in turn, and sequentially gating the receiving circuits Xl, X2……X18……X24, which X coils the pen locates can be determined also. Following is the practical connection of the circuit: the transmitting circuits are in the direction of Y and the receiving circuits are in the direction of X. L10, L11, L12, L13, L14 and L15 stand for chips, among which L13, L14 and L15 are adopted for transmitting signals and L10, L11 and L12 are adopted for receiving signals. A square wave signal, generated by an auxiliary CPU (MCU2), is inputted into pin 3 (X port) of chips L13, L14 and L15 respectively via the transmitting terminals shown in Figure 5. For chip L13, its X0~X7 ports connect with the coils in the direction of Y respectively, whose output terminals are grounded; INH terminal is used for chip selection; A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU; VEE terminal is connected to a negative voltage. For chip L14, its X0~X7 ports connect with the coils in the direction of Y respectively, whose output terminals are grounded; INH terminal is used for chip selection; A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU; VEE terminal is connected to a negative voltage. And for L15, its X0~X7 ports connect with the coils in the direction of Y respectively, whose output terminals are grounded; INH terminal is used for chip election; A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU; VEE terminal is connected to a negative

voltage. The X ports of chip L10, chip L11 and chip L12 are connected together to output the received signal. For chip L10, its X0~X7 ports connect with the coils in the direction of X respectively whose output terminals are grounded; INH terminal is used for chip selection; A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU; VEE terminal is connected to a negative voltage. For chip L11, its X0~X7 ports connect with the coils in the direction of X respectively, whose output terminals are grounded; INH terminal is used for chip selection; A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU; VEE terminal is connected to a negative voltage. And for L12, its X0~X7 ports connect with the coils in the direction of X respectively, whose output terminals are grounded; INH terminal is used for chip selection; A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU; VEE terminal is connected to a negative voltage.

An amplifying circuit according to the present invention is shown in Figure 6 wherein an AGC (automatic gain control) circuit, controlled by the primary CPU, is used to eliminate the signal's distortion resulted from the variation of the distance between the pen and the tablet. The received signal is coupled into the circuit via RX+ terminal, which connects with ends of two parallel resistors named R1 and R2. The other end of the resistor R2 connects with pin 2 of a chip IC12A and one end of a resistor R3 in parallel, and the other end of the resistor R3 connects with pin 1 of the chip IC12A. The other end of resistor R1 connects with one end of a resistor R4, a capacitor C6 and a reference voltage terminal (Vref) in parallel. The other end of the resistor R4 connects with pin 3 of the chip IC12A, whose pin 4 is grounded and pin 8 is connected with a power supply VDD and one end of a capacitor C7 in parallel. The other end of the capacitor C7 connects with the analogue ground. The pin 1 of chip IC12A connects with the pin 12 of chip IC14 and one end of resistor R6 in parallel. The other end of the resistor R6 connects with pin 13 of chip IC14 and one end of a resistor R7 in parallel. The other end of the resistor R7 connects with the pin 14 of chip IC14 and one end of a resistor R8

in parallel. The other end of the resistor R8 connects with pin 15 of chip IC14 and one end of the resistor R9 in parallel. The other end of the resistor R9 connects with pin 1 of chip IC14 and one end of a resistor R10 in parallel. The other end of the resistor R10 connects with pin 2 of chip IC14 and one end of a resistor R11 in parallel. The other end of the resistor R11 connects with pin 4 of chip IC14 and one end of a resistor R12 in parallel. The other end of the resistor R12 connects with pin 5 of chip IC14 and one end of a resistor R13 in parallel. The other end of the resistor R13 connects with a reference voltage terminal (Vref). The pin 3 of chip IC14 connects with one end of a capacitor C1, the other end of the capacitor C1 connects with one end of resistor R16 and the pin 5 of chip IC12B in parallel. The other end of the resistor R16 connects with the reference voltage terminal (Vref). The pin 6 of chip IC12B connects with ends of the resistor R23 and R26 in parallel. The other end of the resistor R26 connects with pin 7 of chip IC12B. The other end of the resistor R23 connects with the reference voltage terminal (Vref). Pin 11 of chip IC14 connects with a signal GA, and pin 10 of chip IC14 connects with a signal GB and pin 9 of chip IC14 connects with a signal GC, and pin 16 of chip IC14 connects with a power supply VDD and one end of a capacitor C14 in parallel. The other end of the capacitor C14 connects with the analogue ground, and so do pin 6, pin 7 and pin 8 of chip IC14. The amplified signal is output from pin 7 of the chip IC12B.

The phase angle and amplitude detecting circuit of the present invention is shown in Figure 7. It is designed to shape the transmitted square wave by eliminating the spikes on the rising edges and on the falling edges. Specifically, an amplified signal is coupled into the circuit via the IN terminal, which connects with pin 3 of a chip IC9A and one end of a resistor R17 in parallel. The other end of the resistor R17 connects with pin 6 of chip IC9B and one end of a resistor R18 in parallel. The other end of the resistor R18 connects with pin 7 of chip IC9B and pin 4 of chip IC8B in parallel. Pin 5 of chip IC9B connects with one end of a resistor R19. The other end of the resistor R19 connects with a reference voltage. Pin 1 of

chip IC9A connects with pin 2 of chip IC9A and pin 8 of chip IC8C. Pin 8 of chip IC9A is connected to a power supply VDD, and pin 4 of chip IC9A connects with an analogue ground. Pin 5 of chip IC8B connects with pin 2 of MCU2. Pin 6 of chip IC8C connects with pin 3 of MCU2. Pin 3 of chip IC8B and pin 9 of chip IC8C are connected together, used as the output terminal to output the detected phase angle and amplitude signals. Pin 11 of MCU2 connects with ends of a capacitor C4 and a resistor R28 respectively, wherein the two other ends of the capacitor C4 and the resistor R28 are connected together to connect with a base of a triode Q1, whose emitter connects with one end of a capacitor C3 in series. The other end of the capacitor C3 connects with one end of a resistor R29 and TX- terminal in parallel. The other end of the resistor R29 connects with VEE. A collector of the triode Q1 connects with TX+ terminal and one end of a capacitor C2 in parallel. And the other end of the capacitor C2 connects with TX- terminal. Pin 5 of MCU2 connects with an OSC clock, and pin 1 of MCU2 connects with ends of a resistor R25 and a capacitor C5 in parallel. The other end of the resistor R25 connects with a power supply VCC, and the other end of the capacitor C5 is grounded. Hang up such pins of MCU2 as pin 4, pin 6, pin 7, pin 8, pin 9, pin 12, pin 13 and pin 14. But let its pin 15 connect with DONE, its pin 16 connect with CMD0, its pin 17 connect with CMD1, its pin 18 connect with CMD2, its pin 19 connect with CMD3, and its pin 20 connect with VCC and one end of a capacitor C19 in parallel. The other end of the capacitor C19 connects with pin 10 of MCU2 and the ground in parallel.

The integrating circuit of the present invention is shown in Figure 8. Signals with two different phases, that is, the phase I and phase J with a phase difference of 90 degree therebetween, are routed in the integrating circuit. The phase I corresponds to the coordinate positions, and the phase J corresponds to the pen's pressure. After shaped by the phase angle and amplitude detecting circuit, a signal is coupled into the integrating circuit via the IN terminal, which connects with one end of a resistor R21 in series. The other end of the resistor R21 connects with pin 2 of chip IC10A, pin 11 of IC8D and one end of a capacitor C21 in parallel. The

other end of the capacitor C21 connects with pin 10 of chip IC8D and pin 1 of chip IC10A in parallel. Pin 12 of chip IC8D connects with the primary CPU. And for chip IC10A, its pin 3 connects with the reference voltage, pin 4 connects with the analogue ground, pin 8 connects with the power supply VDD, and pin 1 connects with one end of a resistor R20. The other end of the resistor R20 is used as the output terminal and connected with an A/D converter.

A kind of wireless, passive and pressure-sensitive tablet is described in the present invention. The resonant circuit in the pen is composed of inductors and capacitors connected in parallel. And the tablet comprises a transmitting and receiving circuit, an amplifying circuit, a phase angle and amplitude detecting circuit and an integrating circuit. During the process of operation, the user takes hold of the pen to write and draw freely on the tablet with suitable pressure (the switch on the side of the pen acts as the right button of a mouse). With the help of the pen, hardware in the tablet and the corresponding application, the handwriting track that the user made on the tablet just now could be displayed on the computer screen. Thus, the object of inputting handwriting into a computer with the wireless and passive method is well achieved. For instance, once a Chinese word "中" is written on the tablet with the equipped pen, it will be displayed on the computer screen immediately. Thus, the present invention makes it more convenient in computer inputting of Chinese words.

WHAT IS CLAIMED IS:

1. A wireless and passive tablet for computer inputting comprising a tablet and a pen, characterized in that the tablet can sense pressure from the pen, the hardware of the tablet comprises a transmitting and receiving circuit, an amplifying circuit, a phase angle and amplitude detecting circuit and an integrating circuit; and the connection relations between them are as follows: a TX+ terminal of the phase angle and amplitude detecting circuit connects with a transmitting terminal of the transmitting and receiving circuit, a receiving terminal of the transmitting and receiving circuit connects with a RX+ terminal of the amplifying circuit, an output terminal (OUT) of the amplifying circuit connects with an input terminal (IN) of the phase angle and amplitude detecting circuit, an output terminal (OUT) of the phase angle and amplitude detecting circuit connects with an input terminal (IN) of the integrating circuit, and an A/D terminal of the integrating circuit is coupled into a primary CPU after A/D conversion; and the tablet's transmitting and receiving process are conducted continuously by a transmitting circuit in the direction Y and a receiving circuit in the direction X.

2. The wireless and passive tablet of claim 1, wherein the transmitting circuit is in the direction Y and the receiving circuit is in the direction X; L10, L11, L12, L13, L14 and L15 stand for chips, among which L13, L14 and L15 are adopted for transmitting signals, and L10, L11 and L12 are adopted for receiving signals; a square wave signal, generated by an auxiliary CPU (MCU2), is inputted into pin 3 (X port) of chip L13, L14 and L15 respectively via a transmitting terminal; for chip L13, its X0~X7 ports connect with the coils in the direction of Y respectively, whose output terminals are grounded, INH terminal is used for chip selection, A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU, VEE terminal is connected to a negative voltage; for chip L14, its X0~X7 ports connect with the coils in the direction of Y respectively, whose output terminals are grounded, INH terminal is used for chip selection, A terminal, B terminal and C

terminal are gating terminals, all connecting with the primary CPU, VEE terminal is connected to a negative voltage; and for L15, its X0~X7 ports connect with the coils in the direction of Y respectively, whose output terminals are grounded, INH terminal is used for chip selection, A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU, VEE terminal is connected to a negative voltage; the X ports of chip L10, chip L11 and chip L12 are connected together to output received signals; for chip L10, its X0~X7 ports connect with the coils in the direction of X respectively, whose output terminals are grounded, INH terminal is used for chip selection, A terminal, B terminal and C terminal are gating pins, all connecting with the primary CPU, VEE terminal is connected to a negative voltage; for chip L11, its X0~X7 ports connect with the coils in the direction of X respectively, whose output terminals are grounded, INH terminal is used for chip selection, A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU, VEE terminal is connected to a negative voltage; and for L12, its X0~X7 ports connect with the coils in the direction of X respectively, whose output terminals are grounded, INH terminal is used for chip selection, A terminal, B terminal and C terminal are gating terminals, all connecting with the primary CPU, VEE terminal is connected to a negative voltage.

3. The wireless and passive tablet of claim 1, wherein the pressure sensed from the pen can be determined as follows: a square wave signal, generated by an auxiliary CPU (MCU2) is input to the transmitting circuit, and via the coils in Y direction of the transmitting circuit, the continuously transmitted electromagnetic wave is inputted into a parallel resonance circuit to induce resonance in the pen, the square wave has higher harmonics with the frequencies of odd times of its own; and the resonance frequency determined by resistors and capacitors in the pen is a certain odd times of the square wave's frequency, therefore, once the pen's resonant coil is induced by the higher harmonics of the square wave of the tablet's coil, it will resonate; and once a resonance signal is received by a receiving coil, it will be amplified by an amplifying circuit and then input to a multiplying circuit,

where the signal's amplitude and phase angle information are extracted; the specific extraction process is as follows: multiplying received signals with a square wave having the same frequency and phase to obtain an amplitude's square value; similarly, multiplying received signals with an orthogonal square wave having the same frequency and a phase difference of 90 degree therebetween to obtain the phase angle's square value; finally, inputting the amplitude and the phase angle into the CPU after A/D conversion with the amplitude corresponding to coordinate values of X and Y, and the phase angle being direct proportion to the pen's pressure; when the pen tip is pressed down, the pen's resonance phase deviates because of the variation of the inductance in the pen; therefore, current pressure from the pen can be obtained by measuring the phase angle.

4. The wireless and passive tablet of claim 1, wherein, the connection relations of the amplifying circuit are as follows: an IN terminal connects with pin 3 of chip IC9A and one end of a resistor R17 in parallel, the other end of the resistor R17 connects with pin 6 of chip IC9B and one end of a resistor R18 in parallel, the other end of the resistor R18 connects with pin 7 of chip IC9B and pin 4 of chip IC8B in parallel; pin 5 of chip IC9B connects with one end of a resistor R19, the other end of the resistor R19 connects with a reference voltage; pin 1 of chip IC9A connects with pin 2 of chip IC9A and pin 8 of chip IC8C; pin 8 of chip IC9A is connected to a power supply VDD, and pin 4 of chip IC9A connects with an analogue ground; pin 5 of chip IC8B connects with pin 2 of MCU2; pin 6 of chip IC8C connects with pin 3 of MCU2; pin 3 of chip IC8B and pin 9 of chip IC8C are connected together, used as an output terminal to output the detected phase angle and amplitude signals; pin 11 of MCU2 connects with ends of a capacitor C4 and a resistor R28 in parallel, wherein two other ends of the capacitor C4 and resistor R28 are connected together to connect with a base of a triode Q1, whose emitter connects with one end of a capacitor C3 in series; the other end of the capacitor C3 connects with one end of a resistor R29 and TX- in parallel; the other end of a resistor R29 connects

with VEE, a collector of the triode Q1 connects with TX+ and one end of a capacitor C2 in parallel; and the other end of the capacitor C2 connects with TX-; pin 5 of MCU2 connects with an OSC clock, and pin 1 of MCU2 connects with ends of a resistor R25 and a capacitor C5 in parallel; the other end of the resistor R25 connects with a power supply VCC, and the other end of the capacitor C5 is grounded; hang up such pins of MCU2 as pin 4, pin 6, pin 7, pin 8, pin 9, pin 12, pin 13 and pin 14; but let its pin 15 connect with DONE, its pin 16 connect with CMD0, its pin 17 connect with CMD1, its pin 18 connect with CMD2, its pin 19 connect with CMD3, and its pin 20 connect with VCC and one end of a capacitor C19 in parallel; the other end of the capacitor C19 connects with pin 10 of MCU2 and the ground in parallel.

5. The wireless and passive tablet of claim 1, wherein signals with two different phases, that is, the phase I and phase J with a phase difference of 90 degree therebetween, are routed in said integrating circuit; said phase I corresponds to coordinate positions, and phase J corresponds to pen's pressure.

6. The wireless and passive tablet of claims 1 or 5, wherein the connection relations of said integrating circuit are as follows: an IN terminal connects with one end of resistor R21 in series; the other end of the resistor R21 connects with pin 2 of chip IC10A, pin 11 of IC8D and one end of a capacitor C21 in parallel; the other end of the capacitor C21 connects with pin 10 of chip IC8D and Pin 1 of chip IC10A in parallel; pin 12 of chip IC8D connects with the primary CPU; and for chip IC10A, its pin 3 connects with a reference voltage, pin 4 connects with an analogue ground, pin 8 connects with a power supply VDD, and pin 1 connects with one end of a resistor R20, the other end of the resistor R20 is used as an output terminal and connected with an A/D converter.

ABSTRACT

This invention refers to peripheral equipment of computer and is a wireless and passive tablet for inputting to computer that converts the track of handwriting to digital X, Y coordinate and then inputs it to computer and then displays the track if the tablet on screen of computer directly with corresponding driver program and application software. The characteristic of the wireless and passive tablet is using the coil of X, Y direction in transmitting and receiving, in the concrete, MCU2 chip generates square wave and inputs to transmitting circuit, the electromagnetic wave transmitted is inputted to circuit of pen to form resonance that will be outputted to receiving circuit connects amplifying circuit to amplifies the signal and input into a phase angle detecting circuit and an amplitude detecting circuit respectively to control the phase angle and amplitude. And then the signal is inputted to primary CPU through integral and A/D conversion to realize the writing function of wireless pen finally.